10/689289

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July 15, 2008

Certificate JUL 22 2008 of Correction

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
ATTN: Certificate of Corrections Branch

RE: U.S. Patent No. 7,395,657

Dear Sir,

Attached find a Certificate Of Correction (PTO/SB/44) for the above named patent. Please make the noted corrections. Thank you.

Sincerely,

Steven J. Rosen

Steven J. Rosen
Patent Attorney of Record
29,972

SJR/ksp

RECEIVED-USPTO
Patent Publication

JUL 22 2008

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: James Edward Johnson

Case No.: 133476

Serial No.: 10/689,289 : : Patent No.: 7,395,657

Filed: 10/20/2003 : : Issued: 07/08/2008

For: FLADE GAS TURBINE ENGINE WITH FIXED GEOMETRY INLET

REQUEST FOR CERTIFICATE OF CORRECTION OF PATENT

Attached in duplicate is Form PTO/SB/44 identifying two corrections that are necessary as a result of printing errors in the above-identified patent. The necessary corrections are also noted below.

In the Specification

In column 3, after line 10 and before line 11, please add the following heading:

DETAILED DESCRIPTION OF THE INVENTION

In the Claims

In column 18, Claim 64, line 17, please change "FIJADE" to --FLADE--

In support of this Request, attached are copies of the pages from the patent with the errors highlighted.

Please send the Certificate of Correction to the Attorney of Record at the address below.

Steven J. Rosen

7/15/08

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Date of Signature

PTO/SB/44 (09-07)
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(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,395,657

APPLICATION NO.: 10/689,289

ISSUE DATE : July 8, 2008

INVENTOR(S) : James Edward Johnson

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

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DETAILED DESCRIPTION OF THE INVENTION

In the Claims

In column 18, Claim 64, line 17, please change "FIJADE" to --FLADE--

JUL 22 2008

MAILING ADDRESS OF SENDER (Please do not use customer number below):

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2008

PTO/SB/44 (09-07)
Approved for use through 08/31/2010. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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FIG. 5 is a schematical cross-sectional view the engine in FIG. 3 with a single expansion ramp nozzle.

FIG. 6 is a schematical cross-sectional view illustration of a FLADE aircraft gas turbine engine with a single direction of rotation fan section connected to the fixed geometry inlet duct in FIG. 1.

FIG. 7 is a schematical cross-sectional view illustration of an exemplary embodiment of an aircraft with the fixed geometry inlet duct leading to the FLADE aircraft gas turbine engine as illustrated in FIG. 1.

Schematically illustrated in cross-section in FIGS. 1 and 7 is a supersonic aircraft **10** having a propulsion system **25** that includes a fixed geometry inlet duct **4** leading to an aircraft FLADE engine **1** which is mounted within the aircraft's main body or fuselage **113**. The embodiment of the propulsion system illustrated herein further includes a flush mounted supersonic air intake **112** to the fixed geometry inlet duct **4**. The air intake **112** is mounted flush with respect to the aircraft's main body or fuselage **113**. The fixed geometry inlet duct **4** extends between the air intake **112** and the engine inlet **13**. The fixed geometry inlet duct **4** includes a convergent/divergent inlet duct passage **111** for supplying all of the airflow requirements of the aircraft's FLADE engine **1**. The convergent/divergent inlet duct passage **111** is illustrated as, but not limited to, a convergent/divergent two-dimensional type having convergent and divergent sections **117** and **119** and a throat **121** therebetween. The fixed geometry inlet duct **4** further includes a transition section **9** between the two-dimensional convergent/divergent inlet duct passage **111** and a round asymmetric engine inlet **13** of the FLADE engine **1**. The transition section **9** is shaped to convert the airflow from two-dimensional to asymmetrical airflow. Two types of aircraft FLADE engines **1** are disclosed herein. The first type is a FLADE engine **1** with a counter-rotatable fan having a fan section **115** including first and second counter-rotatable fans **130** and **132** as illustrated in FIGS. 1-3. The fan section **115** in the second type of FLADE engine **1** has only a single direction of rotation fan **330** as illustrated in FIG. 6.

A FLADE engine (FLADE being an acronym for "fan on blade") is one particular type of variable cycle engines characterized by an outer fan driven by a radially inner fan and discharging its FLADE air into an outer fan duct which is generally co-annular with and circumscribes an inner fan duct circumscribing the inner fan. One such engine, disclosed in U.S. Pat. No. 4,043,121, entitled "Two Spool Variable Cycle Engine", by Thomas et al., provides a FLADE fan and outer fan duct within which variable guide vanes control the cycle variability by controlling the amount of air passing through the FLADE outer fan duct. Other high performance aircraft variable cycle gas turbine FLADE engines capable of maintaining an essentially constant inlet airflow over a relatively wide range of thrust at a given set of subsonic flight ambient conditions such as altitude and flight Mach No. in order to avoid spillage drag and to do so over a range of flight conditions have been studied. This capability is particularly needed for subsonic part power engine operating conditions. Examples of these are disclosed in U.S. Pat. No. 5,404,713, entitled "Spillage Drag and Infrared Reducing FLADE Engine", U.S. Pat. No. 5,402,963, entitled "Acoustically Shielded Exhaust System for High Thrust Jet Engines", U.S. Pat. No. 5,261,227, entitled "Variable Specific Thrust Turbofan Engine", and European Patent No. EP0,567,277, entitled "Bypass Injector Valve For Variable Cycle Aircraft Engines". A FLADE counter-rotatable fan aircraft gas turbine engine is disclosed in U.S. patent application Ser. No. 10/647,881, filed Aug. 25, 2003, entitled "FLADE GAS TURBINE ENGINE WITH COUNTER-ROTATABLE FANS" which is incorporated herein by reference.

The FLADE fan aircraft gas turbine engine illustrated schematically in FIG. 1 includes the fan section **115** in direct fluid flow communication with the fixed geometry inlet duct **4**. At least one row of FLADE fan blades **5** radially extend across a FLADE duct **3** disposed radially outwardly of and circumscribing the fan section **115**. The engine inlet **13** includes a fan inlet **11** to the fan section **115** and an annular FLADE inlet **8** to the FLADE duct **3**. The FLADE engine **1** with the counter-rotatable fan has a fan inlet **11** leading to first and second counter-rotatable fans **130** and **132**. A FLADE fan **2** having at least one row of FLADE fan blades **5** disposed in a FLADE duct **3** through which FLADE airflow **80** is exhausted by the FLADE fan blades **5**. The row of FLADE fan blades **5** is disposed radially outwardly of, operably connected to, and driven by one of the first or second counter-rotatable fans **130** and **132**.

Referring to FIGS. 1 and 2, the second fan **132** is illustrated as the FLADE fan having a row of FLADE fan blades **5** disposed between an axially forward row of variable first FLADE vanes **6** and an axially aft row of variable second FLADE vanes **7**. The second FLADE vanes **7** are illustrated as being variable but may be fixed. The FLADE fan **2** is disposed downstream of an annular FLADE inlet **8** to the FLADE duct **3**. The FLADE inlet **8** and the fan inlet **11** in combination generally form the engine inlet **13**. Referring more particularly to FIG. 2, downstream and axially aft of the first and second counter-rotatable fans **130** and **132** is a core engine **18** having an annular core engine inlet **17** and a generally axially extending axis or centerline **12** generally extending forward **14** and aft **16**. A fan bypass duct **40** located downstream and axially aft of the first and second counter-rotatable fans **130** and **132** circumscribes the core engine **18**. The FLADE duct **3** circumscribes the first and second counter-rotatable fans **130** and **132** and the fan bypass duct **40**.

One important criterion of inlet performance is the ram recovery factor. A good inlet must have air-handling characteristics which are matched with the engine, as well as low drag and good flow stability. For a given set of operating flight conditions, the airflow requirements are fixed by the pumping characteristics of the FLADE engine **1**. During supersonic operation of the engine, if the area of the engine inlet **13** is too small to handle, the inlet airflow the inlet shock moves downstream of the inlet throat **121** and pressure recovery across the shock worsens and the exit corrected flow from the inlet increases to satisfy the engine demand. If the FLADE engine inlet area is too large, the engine inlet **13** will supply more air than the engine can use resulting in excess drag (spillage drag), because we must either by-pass the excess air around the engine or "spill" it back out of the inlet. Too much air or too little air is detrimental to aircraft system performance. The FLADE fan **2** and the FLADE duct **3** are designed and operated to help manage the inlet airflow delivered by the inlet to the fans.

The fan inlet **11** is sized to receive essentially full engine airflow **15** of the engine at full power conditions with the engine inlet **13** essentially closed off by closing the variable first FLADE vanes **6** and the variable second FLADE vanes **7**. The engine is further designed and operated to fully open the inlet of the FLADE duct at predetermined part power flight conditions and essentially close it at full power conditions such as take-off.

The core engine **18** includes, in downstream serial axial flow relationship, a core driven fan **37** having a row of core-

49. An aircraft as claimed in claim 48 wherein the fan section includes only a single direction of rotation fan.

50. An aircraft as claimed in claim 48 wherein the fan section is upstream of a fan bypass duct, includes axially spaced apart first and second counter-rotatable fans, and the FLADE fan blades are drivingly connected to one of the first and second counter-rotatable fans.

51. An aircraft as claimed in claim 48 further comprising a row of variable first FLADE vanes disposed axially forwardly of the row of FLADE fan blades.

52. An aircraft as claimed in claim 51 wherein the fan section includes only a single direction of rotation fan.

53. An aircraft as claimed in claim 51 wherein the fan section is upstream of a fan bypass duct, includes axially spaced apart first and second counter-rotatable fans, and the FLADE fan blades are drivingly connected to one of the first and second counter-rotatable fans.

54. An aircraft as claimed in claim 48 further comprising the row of FLADE fan blades disposed between an axially forward row of variable first FLADE vanes and an axially aft row of second FLADE vanes.

55. An aircraft as claimed in claim 48 further comprising:

a core engine located downstream and axially aft of the fan,

a fan bypass duct located downstream and axially aft of the fan and circumscribing the core engine, and

the FLADE duct circumscribing the fan bypass duct.

56. An aircraft as claimed in claim 55 wherein the fan section includes only a single direction of rotation fan.

57. An aircraft as claimed in claim 55 wherein the fan section is upstream of the fan bypass duct, includes axially spaced apart first and second counter-rotatable fans, and the FLADE fan blades are drivingly connected to one of the first and second counter-rotatable fans.

58. An aircraft as claimed in claim 55 further comprising a row of variable first FLADE vanes disposed axially forwardly of the row of FLADE fan blades.

59. An aircraft as claimed in claim 55 further comprising the row of FLADE fan blades disposed between an axially forward row of variable first FLADE vanes and an axially aft row of second FLADE vanes.

60. An aircraft as claimed in claim 59 wherein the fan section includes only a single direction of rotation fan.

61. An aircraft as claimed in claim 48 further comprising the fixed geometry inlet duct having a two-dimensional convergent/divergent inlet duct passage with convergent and divergent sections, and a throat therebetween and a transition section between the two-dimensional convergent/divergent inlet duct passage and the engine inlet.

62. An aircraft as claimed in claim 61 wherein the fan section includes only a single direction of rotation fan.

63. An aircraft as claimed in claim 61 wherein the fan section is upstream of a fan bypass duct, includes axially spaced apart first and second counter-rotatable fans, and the FLADE fan blades are drivingly connected to one of the first and second counter-rotatable fans.

64. An aircraft as claimed in claim 61 further comprising a row of variable first FIJADE vanes disposed axially forwardly of the row of FLADE fan blades.

65. An aircraft as claimed in claim 64 wherein the fan section includes only a single direction of rotation fan.

66. An aircraft as claimed in claim 64 wherein the fan section is upstream of a fan bypass duct, includes axially spaced apart first and second counter-rotatable fans, and the FLADE fan blades are drivingly connected to one of the first and second counter-rotatable fans.

67. An aircraft as claimed an claim 61 further comprising the row of FLADE fan blades disposed between an axially forward row of variable first FLADE vanes and an axially aft row of second FLADE vanes.

68. An aircraft as claimed in claim 48 further comprising:

a variable throat area engine nozzle downstream and axially aft of the core engine,

cooling apertures in the centerbody and in a wall of the engine nozzle in fluid communication with the FLADE duct, and

afterburners aft and downstream of the low pressure turbine section.

* * * * *